INSTALLATION
OPERATION AND MAINTENANCE

SILTRONIX MODEL 1011D

SILTRONIX
330 VIA EL CENTRO
OCEANSIDE, CALIFORNIA 92054

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NOTICE

The Siltronix Model 1011D Transceiver is designed and constructed using the finest of available components. To insure its long service life perforated material has been used in construction of the cabinet to provide a continuous, large volume flow of cooling air. No other equipment should be placed on top of the Model 1011D as it may interfere with this airflow and affect component life.

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INTRODUCTION

The Siltronix Model 1011D Single Sideband Transceiver is designed to be used in SSB or AM modes in the 10-meter amateur radio band. In addition the 1011D is also a tunable receiver in the CB band.
Power input exceeds 300 watts P.E.P. on single sideband and 60 watts on AM. The Model 1011D includes automatic gain control (AGC) and automatic level control (ALC).
The internal AC power supply permits fixed station or portable operation wherever 117 volts. 50-60 Hertz is available.
Export models for 208-220-240 volts are available on special order.
For 12-14 volts DC operation in mobile, marine, or portable applications, a DC converter unit, Model 14A is available. It attaches to the back of the 1011D in place of the AC power cord connector. Its dimensions are only 1-1/2 x 3 x 4 in.
The Model 1011D generates a single sideband signal by means of a crystal lattice filter, and the transceive operation automatically tunes the transmitter to the received frequency. Provisions are included in the transceiver for operation on either upper or lower side band.
Two power receptacles on the rear panel provide 117 VAC to accessory equipment. One of the receptacles is connected through the front panel power switch and the other is connected directly to the line.

CAUTION
Accessory equipment must not be plugged into the accessory receptacles when the model 14A, 12VDC power converter is in use. Damage to accessory equipment may result.

A digital frequency indicator, Model FD-1011, is available for use with the 1011D. This accessory is powered from the accessory receptacle of the 1011D and indicates the frequency, in megahertz, to which the transmitter or receiver is tuned, on an LED display having five, one-half inch high digits. Installation requires only that mating connectors be plugged into connectors on the rear panel of the 1011D marked “FD-1011 ACC”. The FD-1011 may also be powered from 12VDC in mobile installations.

CAUTION
Refer to the Operation Section, Page 9, before applying power to the transceiver. Failure to follow the Preliminary Checks procedure, therein, will result in permanent damage to the Power Amplifier (P.A.) tube.

SPECIFICATIONS

FREQUENCY RANGES
28.5-29.0 MHz.
26.94-27.44 MHz. (Receive only)

POWER INPUT
Single Sideband, Suppressed Carrier: 300 watts. P.E.P. minimum
AM (Single Sideband with Carrier): 60 watts DC input

DISTORTION
Distortion products down approx. 30db.

UNWANTED SIDEBAND SUPPRESSION
Unwanted sideband down more than 50db.

CARRIER SUPPRESSION
Carrier suppression greater than 50db.

RECEIVER SENSITIVITY
Less than 0.5 microvolt at 50 ohms impedance for signal-plus-noise to noise ratio of 10db.

AUDIO OUTPUT AND RESPONSE
Audio output, 3 watts into a 3.2 ohm load. Response is essentially flat from 300 to 3000 Hz in both receive and transmit.

TRANSMTTER OUTPUT
Wide range Pi-network output matches resistive loads from 50 to 70 ohms.

METERING
Power amplifier cathode current 0-400 ma. on transmit, S-Meter 0-70db over S9 on receive, Relative output in TUNE mode.

FRONT PANEL CONTROLS
A.F. GAIN, R.F. GAIN, AM Sideband Selector, Function Switch (REC.-TUNE), Meter Switch,
Tuning Dial, Dial Set, SPOT Switch, ANL Switch, P.A. LOAD, P.A. TUNE, Band Switch, CARRIER INSERTION,
PRESELECTOR Control, MIC Jack, MIC GAIN Control.

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SPECIFICATIONS (continued)

REAR PANEL CONTROLS AND CONNECTIONS
P.A. BIAS Potentiometer, HEADPHONES Jack, Fuse Holder, Antenna Connector, Jones Plug Power Connector, S-Meter Zero Potentiometer, Two Accessory AC outlets, VFO Output (For FD-1011), and external relay connection (+12VDC on Transmit).

OTHER CONTROLS AND CONNECTIONS
Carrier Balance Control accessible bottom cover.

VACUUM TUBE COMPLEMENT		
V1	VFO Amplifier	12BA6
V2	Transmitter Mixer	12BE6
V3	Driver	6GK6
V4	Power Amplifier	8950
V5	Receiver RF Amplifier	6CB6A
V6	Receiver Mixer	12BE6
V7	First IF Amplifier	12BA6
V8	Second IF Amplifier	12BA6
V9	Product Detector Receive Audio	12AX7
V10	AGC Amplifier / Rectifier	6AV6
V11	AF Output	6GW8
V13	Balanced Modulator	6JH8
V14	Microphone Amplifier	12AX7
TRANSISTOR COMPLEMENT		
Q1	Oscillator	2N706
Q2	Buffer	2N5130
Q3	Carrier Oscillator	2N706

POWER REQUIREMENTS
117 VAC 50-60 Hz at 4 amps. 12-14 volts DC operation with model 14-A converter unit plugged into back of 1011D. Current drain: 8 amps, receive mode, 12 Amps average with voice modulation, 25 amps maximum in TUNE position.

DIMENSIONS

Height	5-1/2 in.
Width	13 in.
Depth	11 in.

WEIGHT

Weight	24 lbs.

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INSTALLATION

GENERAL

The installation of the Siltronix 1011D is not at all difficult, and it involves only the placement of the transceiver in its operational area (fixed or mobile), connection of power (either 117 volts AC, or 12 volts DC), and the connection to an antenna. The following paragraphs are, therefore, devoted to the installation requirements involving microphones, fixed and mobile operation, and recommended antenna types. Before actual installation, be sure to check for possible shipment damage. Remove the cabinet three screws on each side, and check to make sure that all tubes are firmly in place. Remove packing from around the P.A. tube. Replace cabinet.

FIXED INSTALLATION

Locate the 1011D in an area that is well ventilated and which provide complete operational freedom of the front panel controls. Connect the AC power cord to the 12 pin Jones connector on the rear panel. Plug the power cord into a standard 117 volt, 50-60 Hz outlet having a capacity of at least 10 amps.

FIXED ANTENNA

A standard PL-259 coax connector plug will fit the antenna connector on the rear panel of the 1011D. For feed line runs up to 50 feet, RG58 or RG59 is recommended. For longer runs RG8 or RG11 produce less line loss, particularly on 10 meters.
Any of the common antenna systems designed for use on the 10-meter amateur band will work well with the 1011D. However, the amateur should consider an antenna system which best fits his operational requirements. For example, a rotatable beam antenna is usually best suited for DX operation. Methods for constructing antennas and antenna tuners are described in detail in the ARRL Antenna Handbook and similar publications. It is recommended that these publications be consulted during the design of any antenna system.

MOBILE INSTALLATION

Many different methods of mobile installation are possible, and it is expected that hams will find methods which are best suited for their installation requirements. Siltronix has available a Mobile Mounting Kit which is suitable for under-the-dash installations. Figure 1 shows the recommended mounting methods using this kit.

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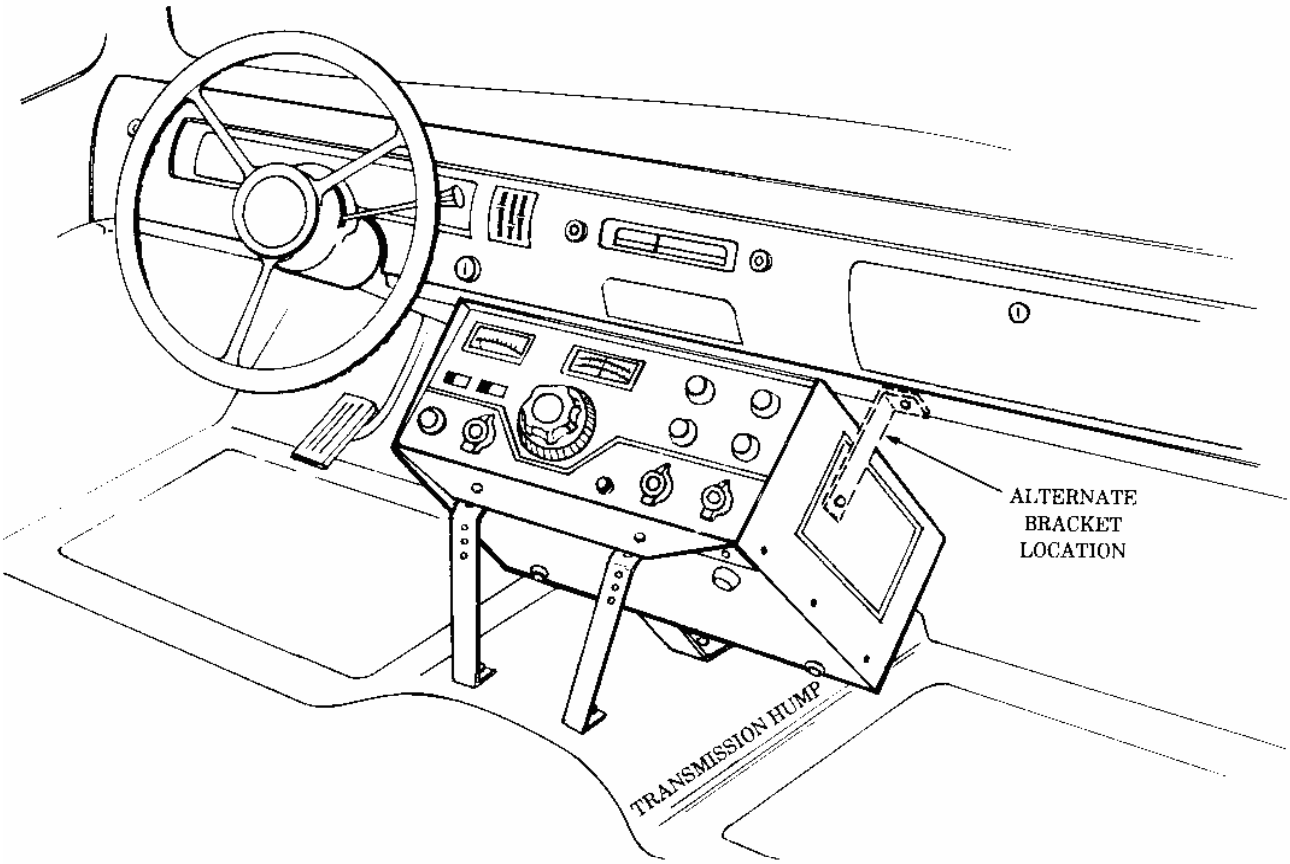
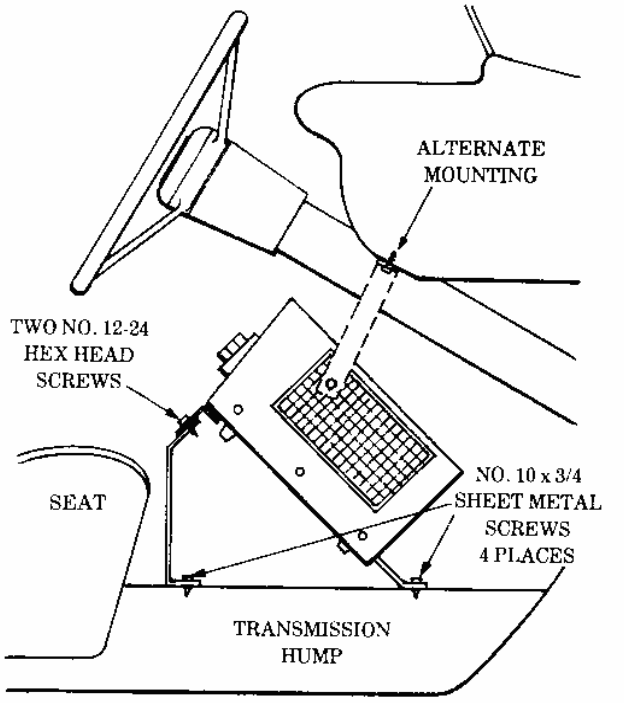
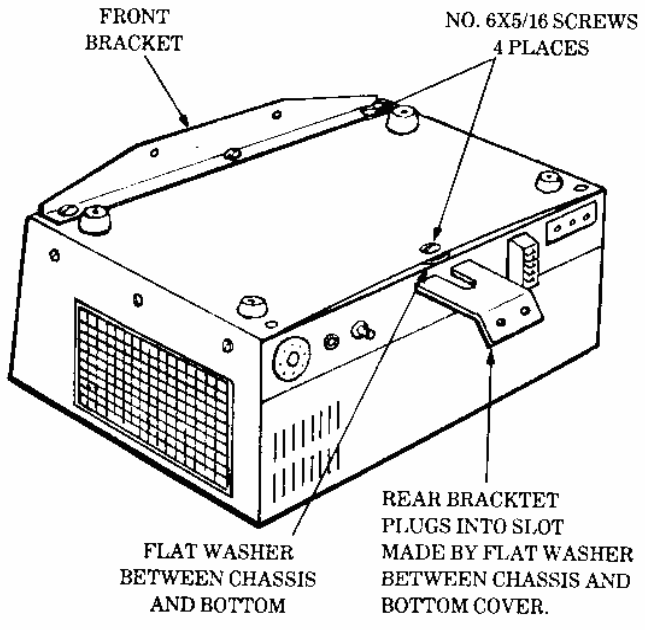




MOBILE MOUNTING, SIDE VIEW



TRANSCEIVER, BOTTOM VIEW

FIGURE 1. MOBILE MOUNTING ON TRANSMISSION HUMP

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DC CONVERTER, MODEL 14A
For 12-14 volt DC operation in mobile installations, it will be necessary to use the Siltronix 14A Converter. The Model 14A D.C. Converter attaches to the rear of the Model 1011D transceiver and converts it to 12-14 volts D.C. input. The 14A D.C. Converter is for normal negative ground systems. Two No. 6 sheet metal screws must be used to attach the 14A firmly to the transceiver.

The Model 14A is conservatively designed for long reliable service with a minimum failure rate. It is designed for easy access and servicing when required. The 14A may be detached quickly from the transceiver and tested individually, thus isolating the source of trouble. It uses two power transistors for switching in a flip-flop oscillator circuit. They are rated at 50 amperes, with a 40 volt rating. Diode spike clipping provides protection against one of the common sources of transistor failure.

The 12 volt electrical system in an automobile will sometimes generate high voltage transients. These can be caused by the starter motor, the alternator or generator, or loose wiring, representing a serious hazard to the transistors in your DC power supply.

It is strongly recommended that the following checks be performed before operating the 1011D.

1) Clean and tighten the battery terminals and clamps.
2) Tighten battery cables where they attach to the starter solenoid and engine block.
3) Inspect battery cables for corrosion or wear. Replace them if their condition is questionable.
4) Check battery condition frequently. If the cells do not hold a similar charge or water level, replace the battery.
5) Check alternator or generator, and regulator connections for security. Also, primary ignition wiring, horn wiring, lights, etc.
6) Check the charging voltage from the alternator. Often the regulator is mis-adjusted, and the voltage setting may be excessive. It should not read more than 14.5 volts at normal engine speeds.

Recommended wire size depends on length. For runs up to 5 feet, use 10 gauge. For 5 to 10 feet, use 8 gauge. Fuse should be rated for 30 amperes, and may be in-line cartridge style, or insulated block holder. The fuse should be located near the battery end of the cable. The transceiver DC cables should be connected directly to the battery.

MOBILE ANTENNAS
The standard type mobile antennas designed for 10 meters or CB band will perform well with the 1011D. Generally speaking, a full length, 8 or 9 foot whip will be more efficient than the shorter inductively loaded types.

MICROPHONE
The microphone input is designed for high impedance microphones only. The choice of microphone is important for good speech quality, and should be given serious consideration. The crystal lattice filter in the transceiver provides all the restriction necessary on audio response, and further restriction in the microphone is not required. It is more important to have a microphone with a smooth, flat, response throughout the speech range. The microphone plug must be a standard 1/4 inch diameter, three contact phone type. The tip connection is for push-to-talk relay control, the ring connector is the microphone terminal and the sleeve is the common chassis ground. The microphone manufacturer's instructions should be followed when connecting the microphone cable to the plug. Either hand-held or desk type microphones with push-to-talk control will provide a suitable installation.

ACCESSORY OUTPUT JACK
A miniature jack on the rear panel, labeled "FD-1011 ACCESS" is provided for connection of the Model FD-1011 Digital Frequency Indicator which is available from Siltronix distributors and dealers. Consult the instructions furnished with the FD-1011 for its connection to the 1011D and its operation.

AUXILIARY RELAY JACK
Connections to the microphone push-to-talk circuit are brought out to the rear panel mounted AUX RELAY jack. The jack is a standard RCA audio connector that is insulated from the chassis. The center connection is connected to +12V and the shell is connected to the microphone keying circuit. Connection to the AUX RELAY jack permits simultaneous keying of the 1011D and accessory units such as a linear amplifier, coaxial relay, etc. on.

CAUTION
Use an insulated cable for interconnecting the 1011D and the accessory unit. Guard against a metal objects making contact between the connector shell and the chassis as undesired keying of the transmitter and accessory unit will result.

CAUTION
The current limit for the aux relay power source is 80 ma. Make certain that this limit is not exceeded or internal damage to the 1011D circuits may result.

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HEADPHONE JACK
A standard 1/4 inch diameter headphone plug will mate with the rear panel mounted headphone jack. A closed circuit jack is used which will disconnect the speaker when the headphone plug is inserted. Headphones with an impedance of 600 ohms or less should be used.

ACCESSORY POWER RECEPTACLES
Two rear panel mounted power receptacles provide 117VAC for accessory equipment only when the unit is powered from an AC source. The one labeled "1I7VAC SW." is connected through the front panel power switch and will be used for equipment that is to be turned on and off with the 1011D. Note that the maximum available current limit is 1 ampere. Equipment requiring no more than 3 amperes maximum may be connected to the other receptacle.
Equipment connected to this receptacle will not be switched off with the 1011D but will have power applied whenever the line cord from the rear panel of the 1011D is plugged into an AC source.

CAUTION
Do not connect equipment to these receptacles when the Model 14A, 12 volt converter is used to power the 1011D. Damage to such equipment from over voltage will result.

Figure 2. SILTRONIX MODEL 1011D REAR VIEW

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OPERATION

The following pages contain instructions on operation of the 1011D including descriptions of all front and rear panel controls and their functions, preliminary checks, transmitter tune-up adjustments and receiver operation in the various modes.

CONTROL FUNCTIONS, FRONT PANEL

S-METER / METER SWITCH

The meter has four functions that are controlled by the position of the Meter Switch:

1) S-Meter: (Switch in S-Meter position). Meter indicates relative strength of received signal. Upper scale is calibrated in S units.

2) Relative Output: (Switch in S-Meter position). Meter indicates relative power output when transmitter is keyed. Scale calibrations are ignored.

3) P.A. Cathode: (Switch held in P.A. Cathode position). Meter indicates total P.A. cathode current in milliamperes read on lower scale of meter.

4) P.A. Bias Indicator: (Switch held in P.A. Cathode position. When transmitter keyed in USB/LSB mode, meter indicates correct bias adjustment when pointer is on small triangle on bottom scale..

TUNE / REC SWITCH

Used during tune-up of transmitter. Transmitter is keyed for tuning purposes when switch is held in Tune position.

MAIN TUNING CONTROL

Adjusts transceiver operating frequency as indicated by calibrations on associated dial.

DIAL SET

This is a dial calibration control. With a known frequency being received, the main tuning dial is set to that frequency and the signal "fine tuned" with the Dial Set Control.

P.A. LOAD CONTROL

This control affects both the transmit and receive sections of the unit. It should be adjusted for maximum power output on transmit. This will also be the correct adjustment for maximum receiver sensitivity.

P.A. TUNE CONTROL

This control affects both the transmit and receive sections of the unit. It should be adjusted for maximum power output on transmit. This will also be the correct adjustment for maximum receiver sensitivity.

BAND SWITCH

The markings on the Band Switch are 27.0 REC and 28.5 XCV. Controls frequency range of the unit. Bottom scale of tuning dial is read when the switch is in the 27.0 position. The upper scales are read when it is in the 28.5 position. The transmitter is inoperative with the switch in the 27.0 position.

CARRIER INSERTION CONTROL

Used on AM Transmit only! Controls the input level to power amplifier tube. Proper AM transmit operation is dependent on proper adjustment of this control. A careful review of the AM Operation section of this manual is recommended before operation in the AM mode.

A.F. GAIN CONTROL

Adjusts the level of receiver audio at the speaker or headphone jack.

R.F. GAIN CONTROL

Adjusts receiver gain. For normal operation, set fully clockwise.

MODE SELECTOR SWITCH

(Marked LSB-USB-AM REC.)

LSB — When in this position, the receiver operates on lower sideband when the Band Switch is in the 27.0 position. Transceiver operation is obtained when the Band Switch is in the 28.5 position.

USB — When in this position, the receiver operates on upper sideband when Band Switch is in the 27.0 position. Transceiver operation is obtained when the Band Switch is in the 28.5 position.

AM REC — Receiver operates on AM when Band Switch is at 27.0 position. Transceiver operates on AM when Band Switch is in the 28.5 position.

WARNING

It is unlawful to transmit in the 28.5 position unless a valid amateur radio operators license is obtained from the Federal Communications Commission.

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CONTROL FUNCTIONS, FRONT PANEL (Continued)

SPOT SWITCH
Used in AM Receive only while tuning in a station. This allows the operator to hear the carrier of an incoming AM station.

ANL SWITCH
Automatic Noise Limiter Switch. Reduces ignition and atmospheric static at the output of the receiver.

MIC JACK
A three conductor plug fits into this jack. Always use a high impedance microphone with the 1011D, (Siltronix CM1011, Shure 444, etc).

MIC GAIN CONTROL
This control adjusts the level of the microphone audio into the transmitter modulator.

PRESELECTOR
This control affects both the transmit and receive sections of the unit. It should be adjusted for maximum power output on transmit. This will then be the correct adjustment for maximum receiver sensitivity.

REAR PANEL CONTROLS / CONNECTORS

POWER CONNECTOR
The AC power cord from commercial service or from the Model 14A DC to AC converter plugs into this receptacle. An AC power cord is supplied with every new 1011D.

P.A. BIAS ADJUSTMENT
This adjustment controls the amount of P.A. idling current which should always be 40 mA. This is preset at the factory but should be checked periodically, usually at the beginning of a day's operation.

ACCESSORY POWER RECEPTACLES
There are two 117 VAC receptacles. One, marked 3A MAX, has power whenever power is applied to the rear panel power connector through the line cord. The other, marked 1A MAX, is switched on and off by the front panel power switch. Neither of these can be used when the unit is being powered by the Model 14A DC to AC converter.

ACCESSORY OUTPUT
The connector marked "FD-1011 ACCESS" is the output to the FD-1011 digital frequency indicator. A mating plug, from the accessory, plugs into the connector. The power for the FD-1011 is obtained from the 117 VAC switched receptacle.

AUX RELAY CONNECTOR
The center pin of this connector is at 12VDC continuously. The outer metal ring is grounded when the transmitter is keyed. It can be used to key the power to a linear amplifier, coaxial antenna relay, etc.

HEADPHONE JACK
For Headphone connection. Speaker is automatically disconnected when headphone plug is inserted. Use low impedance headphones.

S-METER ZERO ADJUSTMENT
Provides a zero adjustment for S-Meter. Adjustment is accomplished with RF GAIN control set fully clockwise and the antenna disconnected.

ANTENNA CONNECTOR
Common antenna connector for receiver and transmitter sections. Mates with PL259 coaxial connector. (Use RG58 or RG8 cable).

FUSEHOLDER
Accepts type 3AG fuse. Protects set from damage due to internal short circuit and overload of the 117 VAC SW receptacle.
Use only 4 ampere fuse.

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1011D PRELIMINARY CHECKS AND ADJUSTMENTS

1) Locate the P.A. compartment and remove the packing material from the P.A. tube if not previously accomplished. (This requires removal of cabinet cover).

2) Set all front panel controls and switches as follows:

- **a)** A.F. Gain Control fully counterclockwise (A.C. Power off in this position).
- **b)** Mode Switch to USB.
- **c)** R.F. Gain Control fully clockwise.
- **d)** Band Switch to 28.5 XCV position.
- **e)** Dial setting 28.7 MHz.
- **f)** ANL Switch OFF.
- **g)** Spot Switch OFF.
- **h)** Dial Set Knob 12 o'clock.
- **i)** Preselector 3 o'clock.
- **j)** Mic Gain Control fully counter-clockwise.
- **k)** Carrier Insertion fully counter-clockwise.
- **l)** P.A. Tune 12 o'clock.
- **m)** P.A. Load 12 o'clock.
- **n)** Meter Switch in the S-Meter position.
- **o)** Tune Receive switch in Rec position.
- **p)** P1ug Microphone into Mic Jack.
- **q)** At this time, all front Panel controls are preset. No power should be applied to the set.

3) Rear Panel Preset Instructions:

- **a)** Connect a 50 ohm dummy load or an antenna through a 50 or 75 ohm feed line to the antenna connector.
- **b)** A good earth ground should be connected to the chassis ground stud bolt on rear panel.
- **c)** The A.C. power cord should now be connected to the rear Power Connector. Plug AC. Cord into 117V A. C. wall outlet.

WARNING

The cabinet cover should be in place whenever the power cord is connected to the unit as dangerously high voltages are present at the plate connection of the power amplifier and other locations with in the unit. Serious injury or death may occur if personnel come in contact with these voltage sources.

At this time the set is still turned off and all controls are preset, antenna or dummy load is now connected to the Set and power cord is attached to the set.

4) Turn A.F. Gain Control clockwise to about 10 o'clock. Power will now come on and the dial light should light. Let the set warm-up for about 5 minutes before proceeding to the next Step.

P.A. BIAS CURRENT CHECK

The P.A. bias has been preset at the factory. However, since it is extremely important that it be set correctly at all times, a check should be made as follows:

1) Perform Preliminary Checks outlined above.
2) Push the Meter Switch down to read P.A. Cathode current.
3) At the same time, key your microphone.
4) While looking at the bottom scale on the front panel meter, note the meter reading. It should be on or near the triangle (40 mA).
5) If adjustment is required, use a small screwdriver to turn the P.A. Bias control on the rear of the set. A small triangle delta symbol on the meter indicates the proper setting of 40 mA. (Be certain that the mode selector is still in the USB position). The P.A. Tube Bias idling current has now been adjusted. No further bias adjustment should be required. However, it is wise to always check the P.A. Bias before the first transmission of the day. The unit is now ready for tune up on the air.

TRANSMITTER TUNING PROCEDURE

Up to this point, all controls and the P.A. Idling Current have been preset. The following steps explain proper transmitter tune up procedure.

1) Ascertain that all front panel controls have been preset correctly as instructed in "B" of the Preliminary Checks.
2) With the antenna connected, locate a clear frequency on which to tune up.
3) Push both the Tune / Rec switch and the P.A. Cathode / S-Meter switch down at the same time. (The transmitter will now be keyed). Peak the preselector for maximum P.A. Cathode Current on the meter as quickly as possible.

CAUTION

Key transmitter for not more than ten seconds at a time and allow ten seconds to elapse between keying periods while tuning up transmitter.

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4) Release P. A. Cathode / S-Meter switch and again push Tune / Rec switch down. Quickly peak P.A. Tune Control for maximum reading on meter. (Meter is now reading relative power output). Release switch.
5) Once again, push Tune Rec switch down and quickly peak PA. Load to maximum meter reading. Release switch.
6) Push Tune / Rec switch down and re peak the P.A. Tune Control. Release switch.
If a calibrated wattmeter is in the antenna line, it should read 70 watts or more when the set is properly tuned - up (Tune / Rec switch in tune position).

You have now completed the transmitter tune - up procedure. If you desire to change frequency and move the dial more than 50 KHz, it will be necessary to re peak the P. A. Tune, P.A. Load, and Preselector Controls Steps 3 through 6.

CAUTION
PROPER TUNING AT ALL TIMES IS EXTREMELY IMPORTANT. IMPROPER TUNING WILL CAUSE PREMATURE POWER AMPLIFIER TUBE FAILURE.

If the receiver is operated with the Band Switch in the 27.0 REC position and the Preselector, P.A. Tune, and P.A. Load controls are adjusted for maximum receiver sensitivity, it will be necessary to retune the transmitter when returning it to operation with the Mode Selector in the 28.5 XCV position.

OPERATION

RECEIVING SINGLE SIDEBAND

In the following instructions, it is assumed that all proceeding Preliminary Checks, P.A. Bias Adjustment and Transmit Tuning procedures have been accomplished as instructed.
Place the Mode Selector Switch in the USB or LSB position as desired. Turn the A.F. Gain Control clockwise to the 3 o'clock position. (If the unit was not previously turned on, wait 30 seconds or more for the tube filaments to warm up). Check that the Carrier Insertion Control is at MIN. Turn the main tuning dial to the desired frequency indication and then carefully adjust the preselector and P.A. Tune Controls for maximum noise output. Readjust A.F. Gain Control as necessary to increase or decrease receiver output to a comfortable level,

NOTE
The PRESELECTOR resonates the transmitter driver stages and the receiver RF amplifier plate circuit. The P.A. TUNE and P.A. LOAD controls adjust the input and output capacitors in the transmitter power amplifier final plate circuit, as well as the receiver RF amplifier grid circuit. Proper adjustment of these controls in the receive position will result in approximately resonant conditions in the transmitter stages.

In practice, the receiver will often be tuned across the band until a signal is heard to which the 1011D operator will want the 1011D transmitter stages tuned. Adjusting the Preselector and P.A. Tune controls for maximum S-Meter indication will provide this tuning while listening to the received signal.
If there is ignition or atmospheric noise present that interferes with the received signal set the ANL switch to the upper position. This will activate the Anti Noise Limiter to limit the peak excursion of the noise in the receiver audio circuits.

RECEIVER TUNING (SSB)
Precise tuning of a single sideband signal is very important. Do not be satisfied to merely tuning until the voice can be understood, but take the extra care of setting the dial to the exact spot where the voice sounds natural. Above all avoid the habit of tuning so that the voice is pitched higher than normal. This is an unfortunate habit practiced by quite a number of operators.
The following points help to explain the effects of mistuning:

1) If you tune so that the received voice is higher than normal pitch, you will then transmit off frequency and your voice will sound lower than normal pitch to the other station. He will probably retune his dial to make you sound right. If this continues, you will gradually ''waltz'' one another across the band. If you are both mistuning to an unnaturally higher pitch, you will "waltz'' across the band twice as fast. And someone will, no doubt, be accused of frequency drift.

2) Mistuning results in serious harmonic distortion of voice, and should be quite noticeable to the average ear. Some will claim that if they don't know how the other person's voice actually sounds, they can't tune him in properly, but this is not true. With a little practice it is quite easy to tell. Some voices are rich in harmonics, and are easier to tune in than a person with a ''flat' voice. Also, a transmitter operated properly, with low distortion, is easier to tune in than one which is overdriven and generating excessive distortion. You will know when you have a station tuned in right on the nose. It will sound just like "AM", so to speak. Mainly, avoid the habit of tuning so everyone sounds higher than normal pitch, or like "Donald Duck". This is incorrect, unnecessary, and irritating to the ear.

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TRANSMITTING SINGLE SIDEBAND

The transmitter frequency will be the same as the received signal frequency as indicated by the position of the main tuning dial, or to any frequency to which the dial is set. If the frequency for transmission is to be the same frequency as the received signal, or on a clear frequency, the transmitter should be tuned per the Transmitter Tuning Procedure on page 11. If it has been tuned up previously, only minor adjustments will be required on a new frequency.
Be certain that the Carrier Insertion Control is in its full counter clockwise position.
After tune-up, key the microphone and turn the MIC GAIN control clockwise as you speak into the microphone until the S-Meter pointer is swinging into the upper third of the scale on voice peaks. No further adjustments will be required from one transmission to another unless frequency is changed. The meter is heavily damped and its peak reading with average voice modulation may not be impressive. However, the voice peaks are well over the 200 watt input rating of your Siltronix 1011D.

NOTE
The unit will not transmit when the Band Switch is in the 27.0 REC position. Transmission on 28.5 XCV is illegal unless the operator holds a valid and appropriate Amateur Radio License issued by the Federal Communications Commission.

RECEIVING AM

In the following instructions, it is assumed that all preceding Preliminary Checks, PA. Bias Adjustment and Transmitter Tuning procedures have been accomplished as instructed.
Place the Mode Selector switch in the AM REC position. Turn the A.F. Gain Control clockwise to the 3 o'clock position. (If unit was not previously turned on. wait 30 seconds or more for the tube filaments to warm up).
Rotate the tuning dial until an AM signal is heard. Place the SPOT switch in the ON (up) position. This will produce a whistle' in the output which should then be adjusted to "zero beat" by fine adjustment of the tuning dial. Turn the SPOT switch OFF (down). The AM station is then precisely tuned in and when transmitting in reply, the 1011D will be on the exact same frequency. Adjust the audio gain for a comfortable listening level. The P.A. Tune and Preselector controls may be adjusted for maximum S-Meter reading.

NOTE
The PRESELECTOR resonates the transmitter driver stages and the receiver RF amplifier plate circuit. The P.A. TUNE and P.A. LOAD controls adjust the input and output capacitors in the transmitter power amplifier final plate circuit, as well as the receiver RF amplifier grid circuit. Proper adjustment of these controls in the receive position will result in approximately resonant conditions in the transmitter stages.

TRANSMITTING AM

The transmitter frequency will be the same as the received signal, as indicated by the main tuning dial, or to any frequency to which the dial is set. If the frequency for transmission is to be the same frequency as the received signal, or a clear frequency, the transmitter should be tuned per the Transmitter Tuning Procedure on page 11. If it has been tuned previously, only minor adjustments will be required on a new frequency.
After Tune-up, push the S-Meter switch down to the P.A. Cathode position and key the microphone. (Work out a means for doing this with one hand as you will need the other free for the next step). Next turn the Carrier Insertion Control clockwise to set the PA. Cathode current at 120 milliamperes then release the switch and microphone switch.
Key the transmitter with the microphone switch and speak into the mike. Advance the microphone Gain Control from its minimum position until the S-Meter pointer just begins to respond on voice peaks.

CAUTION
The Microphone Gain setting is critical. Do not exceed the setting obtained when following the directions in the preceding paragraph. Excessive over modulation, with its attendant distortion, will result. Your signal will be difficult to understand and will contain excessive harmonics that may cause interference on this and other frequency bands.

Proper Microphone Gain settings will be obtained with the control at the 8 or 9 o'clock position. **"Power Mikes" are not recommended for use with the 1011D.** Use a Siltronix CM1011, Shure 144 or other microphone, with similar characteristics.
If the previous adjustments have all been completed correctly, R.F. output will be 10 to 30 watts dead carrier with mike keyed. Do not exceed the carrier insertion limits of 120 mA. or damage to the P.A. tube will result. If reduced carrier power is desired, the carrier insertion can be reduced to produce a meter reading of 100 mA.

DIAL SET
A DIAL SET control provides for precise calibration of the frequency tuning dial. To perform this calibration, a signal of known frequency, preferably from a frequency standard, is required. The procedure requires coupling of the signal to the antenna input directly or by radiation to the connected antenna. The dial is then set to the known frequency. A "whistle" will be heard in the transceiver output. The DIAL SET control is then adjusted to bring the "whistle" frequency to zero (zero beat).

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CIRCUIT THEORY

GENERAL DISCUSSION

The Siltronix 1011D transceiver provides single sideband, suppressed carrier transceive operation, and generates the single sideband signal by means of a crystal lattice filter. To permit a logical discussion of this mode of operation, certain definitions are necessary.

In a normal AM signal (double sideband with carrier) a radio frequency signal is modulated with an audio frequency signal. This is considered by many to be merely a case of varying the amplitude of the carrier at an audio rate. In fact, however, there are actually sideband frequencies generated, which are the result of mixing the RF and the AF signals. These sidebands are the sum of, and the difference between, the two heterodyned signals. In the detection of this conventional AM signal, the two sidebands are mixed with the carrier to recover and reproduce the audio intelligence. This is an inefficient means of transmission because only 25 percent of the transmitted power is used to transmit intelligence. There are other attendant drawbacks also. The bandwidth of AM voice transmission is approximately 6 KHz, while the actual demodulated audio is only approximately 3 KHz. The result is inefficient use of the frequency band, and over half of the allotted band is unusable due to heterodynes, interference, and congestion.

In the single sideband, suppressed carrier mode of transmission, only one of the sideband signals is transmitted. The other sideband and the carrier are suppressed to negligible level. In addition to increasing the transmission efficiency by a factor of four, single sideband effectively doubles the number of stations or channels which can be used in a given band of frequencies.

It should be remembered that in the single sideband, suppressed carrier mode of transmitting, the unwanted sideband and carrier are only suppressed, not entirely eliminated. Thus, with a transmitted signal from a transmitter with a 50 db sideband suppression, the unwanted sideband will be present and will be transmitted, but its level will be 50 db below the wanted sideband. When this signal is received at a level of 20 db over S9, the unwanted sideband will be present at a level of approximately S5. The same is true of carrier suppression. With carrier suppression of 60 db, and a signal level of 20 db over S9, carrier will be present at a level of approximately S3 to S4.

For the following discussion refer to the schematic diagram and to Figures 3, 4, and 5.

SIGNAL GENERATION

When the push-to-talk switch on the microphone is depressed, the transmitter portion of the transceiver is activated, and it generates a single sideband, suppressed carrier signal in the following manner. Carrier is generated by Carrier Oscillator Q3, connected as a Pierce oscillator with the crystal operating in parallel resonance. This stage operates in both the transmit and receive modes. When transmitting, the RF output of the oscillator is injected into the control grid of the Balanced Modulator, V13. This balanced modulator is a beam deflection tube, and operates similar to a cathode ray tube in that the electron beam from the cathode is deflected to one output plate or the other by the charge appearing on the deflection plates. The carrier signal applied to the control grid of the balanced modulator appears on both plates of the output. The two plates are connected to Transformer T1301. The deflection plate DC voltages are adjusted by means of the carrier balance control, R1305, so that the RF signals being applied to the output plates will cancel each other, and the output from T1301 will be zero. Audio signals from the Microphone Amplifier, Vii are applied as a modulating voltage to one deflection plate and the two sidebands resulting from the sum and difference frequencies of the audio and carrier signals appear in the output of transformer T1301. Carrier suppression is approximately 60 db down. The Carrier Insertion control limits the carrier level that can be inserted in AM and thus protects the final amplifier from being overdriven.
The double sideband, suppressed carrier signal is then coupled from the secondary winding of T1301 to the crystal filter, which suppresses the lower sideband, and permits only the upper sideband to be applied to the First IF Amplifier, V7. The carrier frequency is generated at approximately 5500.0 KHz, when the unit is in the upper sideband mode (USB). With the lower LSB sideband crystal the carrier crystal frequency will be 5504.6 KHz, and this positions the double sideband signal on the other side of the filter response curve, attenuating the upper sideband by at least 50 db.

Q1, the VFO 2N706 Oscillator, operates in the common base configuration as a Colpitts oscillator. Q2, the buffer, is used for isolation. The extremely good regulation achieved through using the Zener diode regulator, D1712, across the bias supply voltage, also contributes to the stability.

The VFO, in the Model 1011D, exhibits extremely good stability after the initial warm-up period. Drift from a cold start will be less than 2 KHz during the first hour. After the initial warm-up period drift will be negligible.

The single sideband, suppressed carrier signal from the First IF Amplifier is fed to the Transmit Mixer, V2, where it is heterodyned with the VFO signal. The resultant signal at the desired transmit frequency is amplified by the Driver, V3, and the Power Amplifier, V4.

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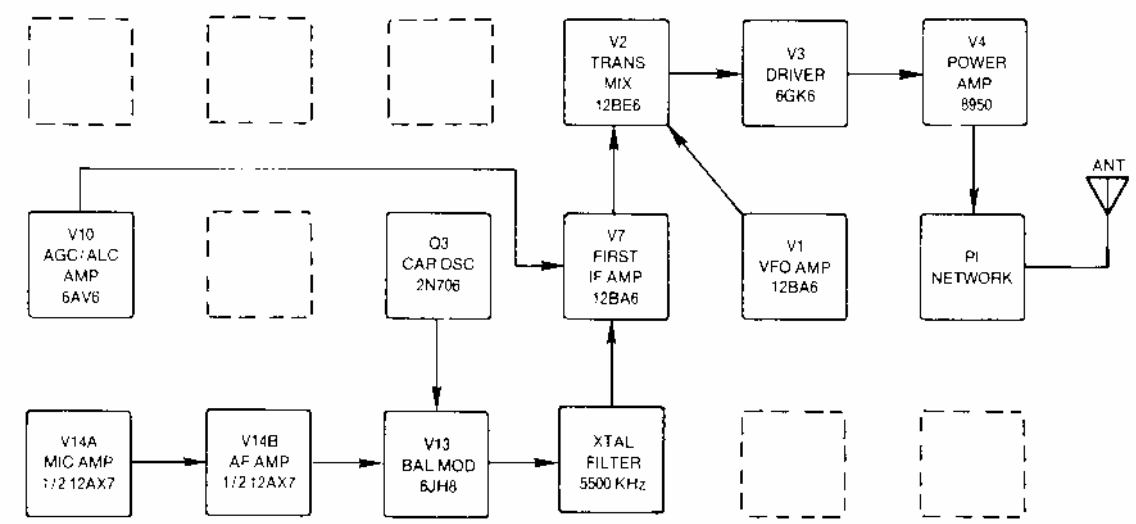

FIGURE 3. BLOCK DIAGRAM, TRANSMIT MODE.

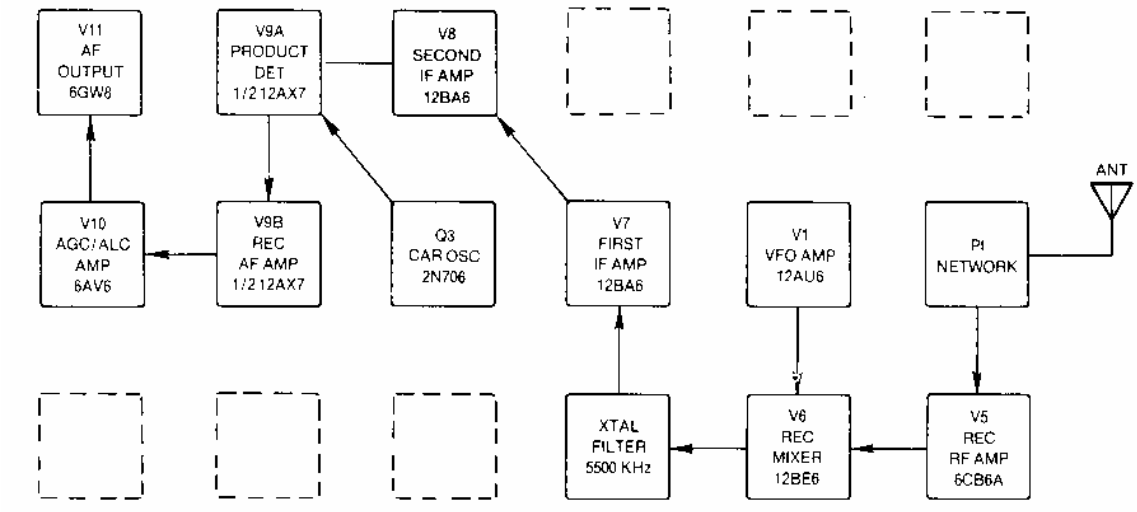

FIGURE 4. BLOCK DIAGRAM, RECEIVE MODE.

The signal from the VFO Amplifier is initiated in the transistorized VFO/Buffer circuit comprised of Q1 and Q2. The signal from the VFO is routed to the VFO Amplifier and is mixed with the single sideband from the IF amplifier, resulting in output in the 10 meter band. When the transceiver is in the TRANSMIT mode, the gain of the First IF Amplifier is controlled through the Automatic Level Control (ALC) network (using the AGC Amplifier Vl0) to control the gain of the stage in response to the average input power to the Power Amplifier. This ALC system will compensate for extremely strong input signals, but does not completely eliminate the necessity of proper adjustment of the MIC GAIN control. This feature will help prevent the transmitter from flat topping and generating spurious emissions, but considerable distortion may occur if the MIC GAIN control is not properly adjusted. Refer to Operating Instructions.

TUNE OPERATION

Normally, the frequency of the carrier oscillator is approximately 300 Hertz outside the 6 db passband of the crystal lattice filter. In TUNE position, the frequency of the carrier oscillator is moved approximately 800 Hertz to place it well within the passband of the crystal lattice filter.

RECEIVE

In RECEIVE position, or at any time when the transmitter is not in TRANSMIT, all circuits used in transmitting are disabled through circuits controlled by relay K1. The relay is energized for transmitting and dc-energized for receiving. One contact, when de-energized, allows received signals from the antenna to be applied, through the transmitter tank circuit, to the receiver R. F. Amplifier,

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V5, where they are amplified and then applied to the control grid of the Receiver Mixer, V6. The local oscillator signal from the VFO Amplifier is then heterodyned with the received signal to produce the IF Frequency. All IF amplification is accomplished at this frequency, nominally 5500.0 KHz, through IF amplifiers V7 and V8. In the Product Detector, V9A, the IF signal is heterodyned with the carrier frequency generated by Carrier Oscillator, Q3. The resultant audio is then amplified by V9B, which then couples to the AGC amplifier, V10, and the audio output stage, V11.

FREQUENCY CALIBRATION

Frequency calibration of the Model 1011D tuning dial is in 5 KHz increments. Dial accuracy and tracking are quite good, but caution must always be observed when operating near band edges. Measuring the frequency with a frequency standard or marker generator when working near band edges is recommended. The procedure for adjusting the dial calibration is covered in the OPERATION section.

TRANSMIT AND RECEIVE SWITCHING

Transmit and receive switching is performed by relay K1. In TRANSMIT, only those tubes that operate in the transmit mode are operative, all others being biased to cutoff through the relay contacts. In RECEIVE, with the relays de-energized, the tubes that are used only in transmit are cut off in the same manner. Relay K1 when de-energized, applies signals from the output Pi-network to the receiver. Note that relay K1 will not operate when the BAND SWITCH control is in the 27.0 REC position.

POWER RATING

The Siltronix 1011D is capable of over 200 watts P.E.P input under steady state two-tone test conditions. The peak envelope power, when voice modulated, is considerably greater, typically 300 watts or more.

The built-in power supply produces a no-load plate voltage of approximately 830 volts. Under TUNE conditions, this voltage will drop to approximately 680 volts and maximum input power will be reduced considerably below the voice P.E.P. rating. Under voice modulation, because average power is considerably less, the power amplifier plate and screen voltages will be maintained higher, even during voice peaks, by the power supply filter capacitors. Peak plate current will, therefore, also be higher than with two-tone test conditions. Under typical operating conditions, peak plate current before flat-topping will be 380 mA at 800 volts, to result in an input of about 300 watts P.E.P. Meter readings of cathode current will not reflect this power input, however, because of the damping in the meter. Cathode current readings under normal voice input should not average more than 100 to 120 mA.

POWER AMPLIFIER PLATE DISSIPATION

There is often a misunderstanding about the plate dissipation of tubes operated as AB1 amplifiers under voice modulation. In the Siltronix 1011D, while in the transmit mode, and with no modulation, the plate voltage will be approximately 830 volts, the plate current 40 mA., and the power input 33 watts. Authorities agree that the average voice power is 10 to 20 db below peak voice power. Normally, some peak clipping in Conditions, the average power input will be 80 watts, and average plate current will be the power amplifier can be tolerated, and a peak-to-average ratio of only 6 db may sometimes occur. Under such conditions, the input power will be 80 watts, and the average plate current will be 100 mA. With power amplifier efficiency of 65 percent, plate dissipation will be approximately 26 watts. The 8950 is rated at 40 watts, continuous duty cycle. Thus it can be seen that under normal operating conditions, the Power Amplifier tube in the 1011D is not being driven very hard. Note, however, that proper modulation level must be maintained by correct setting of MIC GAIN and that the length of time in TUNE position must be limited to not more than 10 seconds at a time.

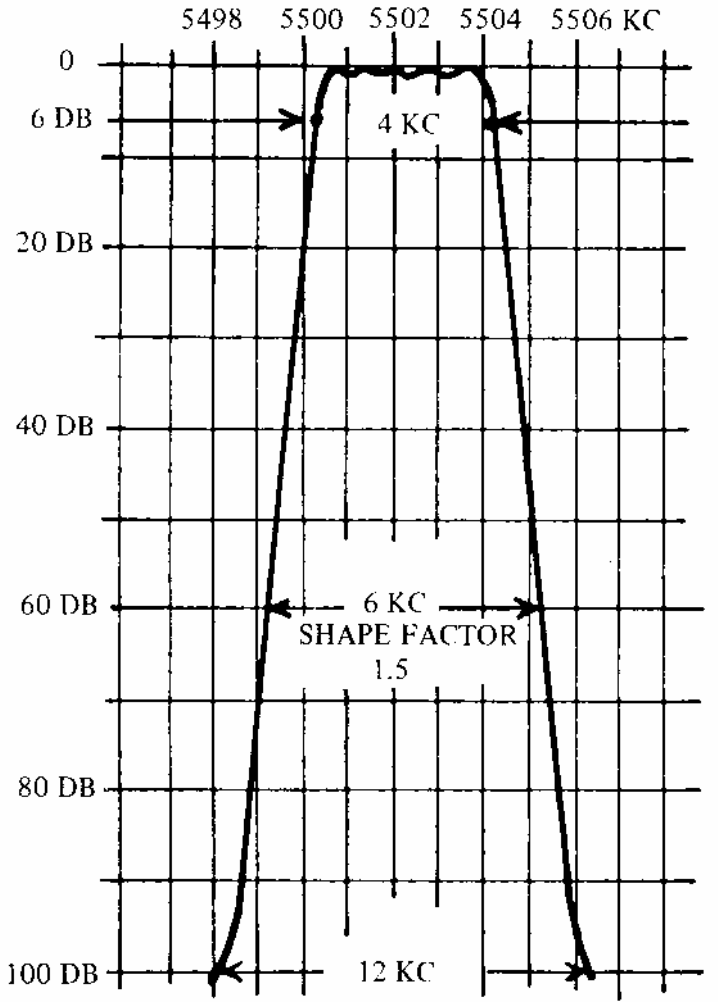

FIGURE 5. CRYSTAL FILTER CHARACTERISTICS.

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ALIGNMENT AND TROUBLESHOOTING

The alignment procedures presented in this section are routine touch-up procedures for all tuned circuits and other adjustments. It is recommended that the procedures be performed in the order presented. However, if complete realignment is not required (as may be the case when just one tube is replaced), perform just those procedures required. Refer to Figures 6 and 7 for component placement.

RECEIVER ALIGNMENT

Receiver alignment involves only the adjustment of the Second IF coil. The RF coils which affect receiver performance are also used in the TRANSMIT mode. Their adjustment is covered under "TRANSMITTER ALIGNMENT".

1) After allowing approximately five minutes for warm-up, tune the receiver to the middle of the band and on a "clear" frequency.
2) Adjust the P.A. TUNE, P.A. LOAD, and PRESELECTOR for maximum noise.
3) Adjust the second IF coil (L801) for maximum background noise.

S-METER ADJUSTMENT

With the antenna disconnected, R.F. GAIN control fully clockwise, and S-Meter switch in S-METER position, set R705, (S-Meter zero), located on the rear panel, for zero meter reading. Determine that no local signals are being received.

TRANSMITTER ALIGNMENT

1) To adjust the Power Amplifier Bias (after allowing approximately five minutes for warm-up):
  a) Hold Meter Switch in P.A. CATHODE position.
  b) Rotate CARRIER INSERTION control fully counterclockwise.
  c) Rotate Mic Gain control fully counterclockwise, then key the transmitter with the microphone switch. Adjust the Carrier Balance control, R1309 on the bottom cover, for a null.
  d) Again, key the transmitter with the microphone switch, and without speaking into the microphone, adjust the P.A. BIAS control on the rear panel until the meter reads 40 mA of idling current. This point is indicated on the meter by the small triangular "delta" symbol.

2) The alignment of transmitter circuits involves the adjustment of tuned circuits in the VFO Amplifier, V1, the Transmit MIXER, V2, and the DRIVER stage, V3. It is recommended that a 50 ohm dummy load be connected to the antenna jack during this series of adjustments
  a) Set the tuning dial to approximately 28.5 MHz, and the PRESELECTOR control at 12 o'clock.
  b) Set P.A. LOAD control to 9 o'clock.
  c) Set Meter switch to P.A. CATHODE.
  d) Press Mic button. Check idling current. It should be on the "delta" symbol when the CARRIER BALANCE control is nulled, and the CARRIER INSERTION control is fully counterclockwise. Adjust P.A. BIAS control, on rear panel if necessary.
  e) With Mic button depressed, adjust CARRIER BALANCE control for slight increase in meter reading, (50 to 60 mA.). Adjust P.A. TUNE control to resonance (dip).
  f) Adjust coils L101, L201, and L301, for maximum reading. When reading goes higher than 80 mA., or so, adjust CARRIER BALANCE control for 60 mA. again.
  g) Adjust coils carefully for maximum peak. Exercise caution with CARRIER BALANCE control. Do not exceed 100 mA reading for more than a few seconds. Be sure P.A. TUNE control is resonated (adjusted for "dip" in meter reading).

3) Power Amplifier Neutralization.
  a) After allowing approximately five minutes for warm-up, tune transmitter to approximately 28.5 MHz.
  b) Set the P.A. LOAD control to 9 o'clock.
  c) Set S-Meter switch to P.A. CATHODE.
  d) Key the transmitter with the Mic button, and without speaking into the microphone, adjust the CARRIER BALANCE control for a reading of approximately 100 mA. Quickly adjust the PRESELECTOR for a peak. Quickly readjust the CARRIER BALANCE control to 100 mA. if it increased to a higher reading.
  e) With the Mic button still depressed, rotate the PA. TUNE control through its range from 9 o'clock to 3 o'clock. You will note a pronounced dip in meter reading at resonance. Observe any tendency for the meter to "peak" above the 100 mA. plateau on either side of resonance. If there is such a peak, adjust C101, the P.A. NEUTRALIZING trimmer, to suppress the peak. When properly neutralized, the meter reading will hold steadily at 100 mA. except for the sharp dip at resonance, but there will be no peak above the 100 mA. level.
  f) Key the transmitter with the Mic button, and readjust the CARRIER BALANCE control for minimum Power Amplifier current. Power Amplifier idling current should be on the "delta" symbol. If not, repeat the Power Amplifier Bias adjustment described in TRANSMITTER ALIGNMENT, STEP 1.

4) Carrier Frequency Adjustment. A dummy load, wattmeter and audio generator are required for this adjustment.
  a) After allowing a five minute warm-up period, tune the transmitter to approximately 28.5 MHz with the Mode Selector at USB.
  b) Key the transmitter with the Mic button, and adjust the CARRIER BALANCE control for minimum Power Amplifier current.
  c) Insert a 1500 Hz audio signal from an audio generator into the MIC jack on the front panel. Adjust the gain of the audio generator and the MIC GAIN control (R1404) until the wattmeter reads approximately 10 to 15 watts.

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d) Adjust the First I.F. coil, L701, for maximum RF output. Adjust both slugs of the balanced modulator transformer, T1301, for maximum RF output.

e) Increase the output of the audio generator until the wattmeter reads 40 watts. Reset the audio generator to 200 Hertz and adjust the USB carrier oscillator trimmer, C1503, for a reading of 10 watts.

f) Switch the Mode Selector to the LSB position. Adjust the LSB carrier oscillator trimmer, C1501, for a reading of 10 watts.

g) Reset the audio generator to 1500 Hertz, the output power to 40 watts. Reset the audio generator to 200 Hertz and readjust carrier oscillator trimmers, if required, for 10 watts.

NOTE
An HF signal generator or AM transmitter covering the CB or 10-meter bands will be required for the following adjustments.

h) Set the Mode Selector switch to USB. Tune in an AM carrier from the transmitter or an unmodulated signal from the generator. Adjust the main tuning dial for a zero heat at the transceiver output.

i) Set the Mode Selector switch to LSB and retune for zero heat using the LSB VFO shifter (C1621)

NOTE
An AM transmitter must be used for the following steps.

j) Apply voice modulation to the AM transmitter and adjust the AM VFO shifter (C1613) for best received audio quality.

k) Remove modulation from the AM transmitter. Turn the SPOT switch on and adjust the AM carrier oscillator trimmer (1507) for zero beat.

5) VFO Calibration.

After allowing approximately five minutes for warm up, set the main tuning dial to the frequency standard or marker generator signal nearest to the center of the band to be calibrated. Adjust the DIAL SET to the 12 o'clock position. Locate the VFO cover and adjust the appropriate trimmer to zero beat the VFO with the standard or generator signal. This adjustment procedure should be performed for both bands with the Sideband Selector in the USB position.

Use an insulated alignment tool for adjustment. Accuracy in other parts of the bands will be quite good, but remember that the 1011D is not to be considered a frequency standard; be cautious when operating near band edges.

6) Troubleshooting.

The information contained in Figures 6 and 7, together with the voltage and resistance measurements in Table 1, and the information in Table 2, should be sufficient for most troubleshooting by the average licensed amateur radio operator. Note that the conditions for making the voltage and resistance measurements of Table 1 are as follows:

a) RECEIVE:
- **i)** R.F. Gain Control in "minimum" position.
- **ii)** Mode Selector Switch in "AM REC" position.
- **iii)** Main Tuning Control set to middle of range.
- **iv)** Band Switch set to "28.5"
- **v)** Antenna connection terminated in 50 ohm dummy load.
- **vi)** A.F. Gain Control:
  - (1) In "OFF" position for resistance measurements.
  - (2) Switch at "ON" position but gain set at "minimum" for voltage measurements.
- **vii)** ANL in "OFF" position.
- **viii)** Spot Switch in "OFF" position.

b) TRANSMIT:
- **i)** Mic Gain Control in "minimum" position.
- **ii)** Band Switch set to "28.5".
- **iii)** Transmitter fully tuned in middle of band.
- **iv)** Voltage measured with Tune-Rec Switch in the "TUNE" position.

NOTE: All voltages / resistances are plus or minus 20%.

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FIGURE 6. SILTRONIX MODEL 1011D, TOP VIEW.

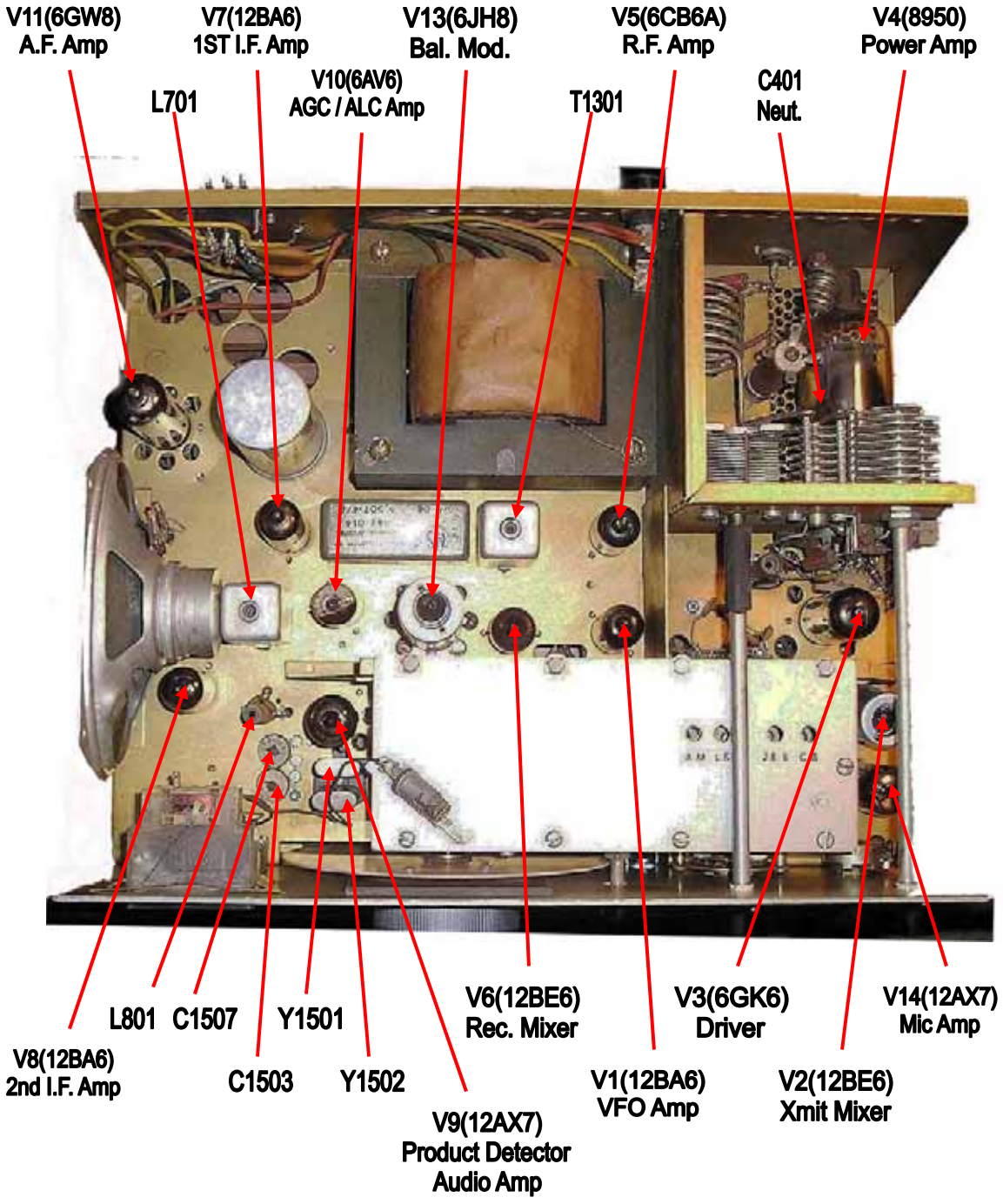

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FIGURE 7. SILTRONIX MODEL 1011D, BOTTOM VIEW.

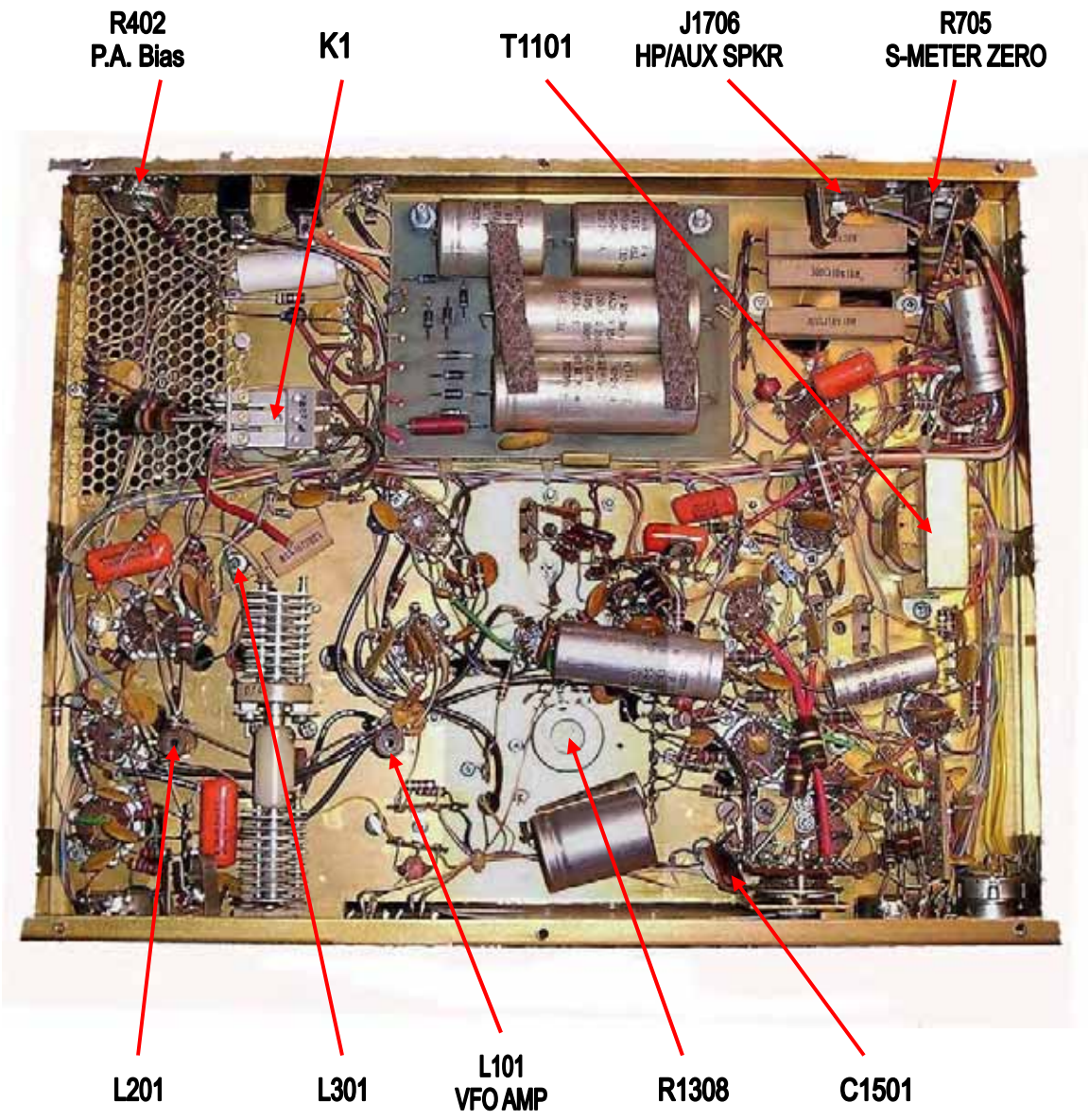

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TABLE 1. VOLTAGE AND RESISTANCE MEASUREMENTS.

Voltage measurements were taken using a HEWLETT PACKARD Model 410C/B VTVM. Resistance measurements were taken using a SIMPSON Model 260 Volt-Ohm meter. Refer to other conditions for measurements on page 18.

TUBE TYPE	R =Rec. T =Trans.	Socket Pin Numbers								
		1	2	3	4	5	6	7	8	9
V1 12BA6 VFO Amp	R Volts T Volts Ohms	0 0 852	0 0 0	0 0 0	12.6AC 12.6AC 0	130 120 >50K	40 38 l00K	.38 .38 60 Ω		
V2 12BE6 Trans. Mixer	R Volts T Volts Ohms	-2.5 -2.5 l00K	0 0 0	0 0 0	12.6AC l2.6AC 0	212 195 >50K	-2.5 105 25K	0 -10.0 25K		
V3 6GK6 Driver	R Volts T Volts Ohms	0 .9 10 Ω	-6.2 -6.2 50K	0 0 0	12.6AC 12.6AC 0	6.3AC 6.3AC 0	NC NC NC	260 230 >30K	0 170 100 Ω	0 0 0
VS 6CB6A Rec. R.F.	R Volts T Volts Ohms	-.35 -9.5 26K	0 0 0	6.3AC 6.3AC 0	12.6AC 12.6AC 0	215 200 >30K	95 -4.6 >40K	0 0 0		
V6 12BE6 Rec. Mixer	R Volts T Volts Ohms	-4.0 -3.8 82 Ω	0 0 0	0 0 0	12.6AC 12.6AC 0	260 220 >40K	95 0 l00K	-.7 -10.0 56 Ω		
V7 12BA6 1st IF.	R Volts T Volts Ohms	-1.2 -1.5 l00K	0 0 0	0 0 0	12.6AC 12.6AC 0	200 165 >30K	100 95 40K	0 0 0		
V8 12BA6 2nd IF.	R Volts T Volts Ohms	-1.5 -33 13K	0 0 0	0 0 0	12.6AC 12.6AC 0	195 0 >30K	95 0 >40K	0 0 0		
V9 12AX7 Det. A.F.	R Volts T Volts Ohms	95 -4.3 370K	-2.5 -3.6 7.5 Ω	0 0 270 Ω	0 0 0	NC NC NC	125 0 125K	-1.1 -1 1M	0 0 0	6.3AC 6.3AC 0
V10 6AV6 AGC Amp	R Volts T Volts Ohms	0 0 500K	1.7 1.4 5K	6.3AC 6.3AC 0	12.6AC 12.6AC 0	NC NC NC	0 -.37	210 165 >40K		
V11 6GW8 A.F. Output	R Volts T Volts Ohms	0 0 110 Ω	1.5 .4 2.7K	215 0 >30K	0 0 0	6.3AC 6.3AC 0	255 225 >30K	6.5 0 270 Ω	0 -.85 1.1M	155 -.2 120K
V13 6JH8 Bal. Mod.	R Volts T Volts Ohms	0 0 3K	0 9 110K	0 90 6K	6.3AC 6.3AC 0	0 0 0	-2 -1.8 25K	0 0 0	0 130 14K	0 130 14K
V14 12AX7 Mic Amp	R Volts T Volts Ohms	55 55 820K	-.47 -.47 2M	0 0 0	0 0 0	12.6AC 12.6AC 0	-42 76 200K	0 0 0	.13 .53 1K	NC NC NC
		1	2,6	3,11	4,10	5,9	7,8	12	Plate	
V4 8950 Power Amp	R Volts T Volts Ohms	0 0 0	0 22 3 Ω	0 175 100	0 0 0	-60 -60 18K	NC NC NC	12.6AC 12.6AC 0	+840 +750	

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TABLE 2. TROUBLESHOOTING GUIDE.

Defect	Possible Cause
PA Idling Current Unstable	1. Defective Power Amplifier Tube (V4). 2. Defective BIAS control and/or associated components. 3. Defective bias power supply.
Inability to Load per Operating Instructions	1. Antenna not resonant at operating frequency. 2. Defective transmission line. 3. Defective antenna loading coil(s). 4. Tubes V1 through V4 defective
Insufficient Sideband Suppression	1. Carrier Oscillator (Q3) operating on incorrect frequency. 2. Crystal filter defective or mistuned.
Insufficient Carrier Suppression	1. Tube V13 defective. 2. Transformer T1301 defective or mistuned. 3. Carrier Oscillator (Q3) operating on incorrect frequency.
Microphonics in Transmitter	1. Tubes V13 and / or V14 defective. 2. IF coil L701 Defective or incorrectly adjusted. 3. Microphone defective.
Low Receiver Sensitivity	1. Tubes V5 through V10 defective. 2. Incorrect adjustment of the transmitter Pi-Network. 3. IF coil L801 incorrectly adjusted or defective. 4. K1 relay contacts defective.

TABLE 3. VF0 AND CARRIER OSCILLATOR FREQUENCIES.

Tuning Dial	V1 Injection Frequency	Q1 Osc. Frequency	Q3 Osc. Carrier Frequency
26,950 KC	21,450 KC	(1/2) 10,725 KC	5500 KC
27,260 KC	21,760 KC	(1/2) 10,880 KC	5500 KC
28,500 KC	23,000 KC	(l/2) 11,500 KC	5500 KC
29,000 KC	23,500 KC	(1/2) 11,750 KC	5500 KC

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PARTS LIST

CAPACITORS
Unless otherwise specified, capacitors are listed in picofarads with a whole number and in microfarads with a decimal number.

C101	0.01 , + 80, -20°/o, 500V Disc	C1001	0.05, 200V, Mylar
C102	0.002. 20%, 1KV Disc	C1002	0.05, 200V, Mylar
C103	27 pf Disc.	C1003	0.001, 20% Disc
C105	15 pf Disc.	C1004	0.01, + 80, -20%, 500V Disc
C106	5 pf Disc.	C1005	0.001, 20% Disc
C107	2 pf Disc.	C1006	0.001, 20% Disc
C110	0.01 , + 80, -20°/o, 500V Disc	C1007	0.001, 20% Disc
C111	0.002. 20%, 1KV Disc	C1101	220 pf Disc
C112	100pf. 500V Disc	C1102	0.002, 20%, 1KV Disc
C202	0.002, 20%, 1KV Disc	C1103	500 pf Disc
C203	470pf SM	C1104	0.01, 10%, 1KV Tubular
C201	2pf, 500V Ceramic	C1105	20 mfd., 25V
C205	0.002, 20%, 1KV Disc.	C1106	2 mfd., 450V
C206	1.5 pf	C1301	0.01, + 80, -20%, 500V Disc
C207	0.01	C1302	0.01, + 80, -20%, 500V Disc
C2A	20pf Driver Tuning	C1303	0.01, + 80, -20%, 500V Disc
C2B	20pf Driver Tuning	C1304	0.01, + 80, -20%, 500V Disc
C302	0.002, 20°/o, 1KV Disc	C1305	0.01, + 80, -20%, 500V Disc
C303	510 pf SM	C1306	220 pf Disc
C301	0.002, 20%, 1KV Disc	C1307	0.002, 20%, 1KV Disc
C305	5pf	C1401	0.01, + 80, -20%, 500V Disc
C401	20 pf Neutralization Trimmer	C1402	0.1, 10%, 400V Mylar
C402	l5 pf, 3KV Disc	C1403	0.01, + 80, -20%, 500V Disc
C403	0.01, ± 80, -20%, 500V Disc	C1404	0.01, + 80, -20%, 500V Disc
C404	0.002. 20%, 1KV Disc	C1405	0.1, 10%, 400V Mylar
C405	0.01, + 80, -20%, 500V Disc	C1406	100 pf Disc
C406	270 pf. 2500V Mica	C1407	0.01, + 80, -20%, 500V Disc
C407	40 pf P.A. Tune	C1501	6-30 pf Ceramic Trimmer
C408	410 pf P.A. Load	C1502	10 pf Disc
C409	0.01, + 80, -20%, 500V Disc	C1503	6-30 pf Ceramic Trimmer
C410	0.01, + 80, -20%, 500V Disc	C1504	270 pf SM
C501	0.01, + 80, -20%, 500V Disc	C1505	270 pf SM
C502	0.01, + 80, -20%, 500V Disc	C1506	0.01, + 80, -20%, 500V Disc
C503	30 pf Disc	C1507	30 pf
C601	0.01, + 80, -20%, 500V Disc	C1601	Selected Value
C602	220 pf Disc	C1602	5 pf Trimmer
C603	430 pf SM	C1603	5 pf Trimmer
C701	1 mfd, 50V	C1605	Selected Value
C702	50 pf Disc	C1608	10 pf Main Tuning
C703	0.01, + 80, -20%, 500V Disc	C1609	Selected Value
C704	0.01, + 80, -20%, 500V Disc	C1610	2 pf Dial Set
C705	2pf Disc	C1611	20 pf Disc
C706	0.01, + 80, -20%, 500V Disc	C1612	270 pf SM
C801	0.01, + 80, -20%, 500V Disc	C1613	5-30 pf Ceramic Trimmer
C802	0.01, + 80, -20%, 500V Disc	C1614	0.01, + 80, -20%, 500V Disc
C803	0.01, + 80, -20%, 500V Disc	C1615	0.01, + 80, -20%, 500V Disc
C804	50 pf Disc	C1616	300 pf SM
C805	50 pf Disc	C1617	27 pf SM
C806	2 mfd., 450V	C1618	0.01, + 80, -20%, 500V Disc
C901	220pf Disc	C1619	0.01, + 80, -20%, 500V Disc
C902	0.002, 20%, 1KV Disc	C1620	0.002, 20%, 1KV Disc
C903	150pf Disc	C1621	5-30 pf Ceramic Trimmer
C904	2 mfd., 450V	C1622	0.01, +80, 20%, 500V Disc
C905	500pf Disc	C1701	0.01, + 80, 20%, 500V Disc

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CAPACITORS (Continued)

C906	0.002, 20%, 1KV Disc	C1702	100 mfd., 35V
C907	40 mfd., 350V	C1703	0.01 , + 80, -20%, 500V Disc
C1705	0.0047, 1KV	C1712A	80 mfd., 400V
C1706	0.0047, 1KV	C1712B	80 mfd., 100V
C1707	150 mfd., 150V	C1712C	5 mfd., 400V
C1708	100 mfd., 350V	C1712D	5 mfd., 400V
C1709	100 mfd., 350V	C1713	150 mfd., 150V
C1710	0.002, 20%, 1KV Disc	C1714	150 mfd., 150V
C1711	0.01, +80, -20%, 500V Disc		

DIODES

D201	1N914
D401	1N34A
D501	1N914
D701	1N914
D702	1N914
D703	1N914
D901	1N34A
D1001	1N914
D1002	1N34A
D1003	1N34A
D1601	1N914
D1701	1N4005
D1702	1A, 600V
D1703-1711	RCA 39804
D1712	1N4742 Zener

COILS

L101	VFO Amp
L201	Trans. Mixer
L301	Driver
L302	82uh Choke
L401	82uh Choke
L402	55uh Choke
L403	Pi-Network
L404	3Ouh Choke
L701	5500 KHz IF
L801	5500 KHz IF
L1501	200uh Choke
L1601	VFO Coil
L1602	200uh Choke
L1603	200uh Choke
L1701	200uh Choke
L1702	17uh Choke
Z401	Parasitic Suppressor

RELAYS

K1	3PDT Relay, 12 VDC Coil

TRANSISTORS

Q1	2N706	Oscillator
Q2	2N5130	Buffer
Q3	2N706	Carrier Oscillator

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RESISTORS

All resistors are 1/2 watt 10% tolerance unless otherwise specified.

R101	82 Ohm	R801	100K Ohm	R1311	27K Ohm
R102	47K Ohm	R802	1K Ohm	R1312	Selected Value
R103	10K Ohm, 2W	R803	4.7K Ohm	R1313	5K Ohm Car Ins Pot
R104	56 Ohm	R901	100K Ohm	R1401	15K Ohm
R201	27K Ohm	R902	270 Ohm	R1402	47K Ohm
R202	100K Ohm	R903	270K Ohm	R1403	1K Ohm
R204	10K Ohm 2W	R904	47K Ohm	R1404	1M Ohm Mic Gain Pot
R205	470K Ohm	R905	10M Ohm	R1405	270K Ohm
R206	2.7K Ohm	R906	1M Ohm	R1406	470K Ohm
R207	100K Ohm	R907	47K Ohm	R1407	2.2M Ohm
R301	100K Ohm	R908	100K Ohm	R1408	47K Ohm
R302	100K Ohm	R909	1K Ohm, 1W	R1501	47K Ohm
R303	10 Ohm	R100l	1M Ohm	R1502	68K Ohm, 2W
R304	100 Ohm	R1002	270K Ohm	R1503	22K Ohm
R401	100 Ohm	R1003	470K Ohm	R1504	2.2K Ohm
R402	25K Ohm Bias Pot	R1004	4.7K Ohm	R1505	1.5K Ohm
R403	4.7K Ohm	R1005	15K Ohm	R1506	100 Ohm
R404	1K Ohm	R1006	2.2M Ohm	R1507	47K Ohm
R405	3 Ohm, 5W	R1007	270K Ohm	R1601	2.7K Ohm
R406	100 Ohm, 5W	R1008	2.2M Ohm	R1602	1.5K Ohm
R407	2.7K Ohm	R1009	l00K Ohm	R1603	1K Ohm
R408	15K Ohm	R1010	150K Ohm, 1/2W	R1604	4.7K Ohm
R501	100K Ohm	R1101	1M Ohm AF Gain Pot	R1605	470 Ohm
R502	220K Ohm	R1102	2.7K Ohm	R1606	2.7K Ohm
R503	470 Ohm	R1103	100K Ohm	R1607	1K Ohm
R504	10K Ohm	R1104	1M Ohm	R1608	470 Ohm
R505	25K Ohm RF Gain Pot	R1105	270 Ohm	R1609	470 Ohm
R506	10K Ohm	R1106	680 Ohm, 1/2W	R1610	47K Ohm
R507	470K Ohm	R1301	1K Ohm	R1701	10K Ohm, 2W
R601	470K Ohm	R1302	10K Ohm	R1702	4.7 Ohm
R701	1.5K Ohm	R1303	10K Ohm	R1703	150K Ohm, 2W
R702	33K Ohm, 2W	R1301	270K Ohm	R1704	150K Ohm, 2W
R703	1K	R1305	10K Ohm, 1W	R1705	800 Ohm, 10W
R704	47K Ohm	R1306	27K Ohm	R1706	1.2K Ohm, 5W
R705	25K Ohm, S-Meter Zero	R1307	27K Ohm	R1707	270K Ohm
R706	15K Ohm	R1308	5K Ohm Car Bal. Pot	R1708	2.7K Ohm
R707	47K Ohm, 2W	R1309	1K Ohm	R1709	800 Ohm, 10W
R708	100K Ohm	R1310	100K Ohm	R1710	500 Ohm, 10W

SWITCHES

S1A-B	Bandswitch
S2	Power Off / On (Part of AF Gain)
S3	Rec. Tune
S4	P.A. Cath / S-Meter
S5	ANL
S6	Sideband Selector

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TRANSFORMERS

T1101	A.F. Output Transformer
T1301	5500 KHz Bal. Mod. Transformer
T1701	Power Transformer

TUBES

V1	12BA6	VFO Amp
V2	12BE6	Trans. Mixer
V3	6GK6	Driver
V4	8950	Power Amp
V5	6CB6A	Rec. RF Amp
V6	12BE6	Rec. Mixer
V7	12BA6	First IF Amp
V8	12BA6	Second IF Amp
V9	12AX7	Product Detector / Rec. Audio
V10	6AV6	AGC / ALC Amp
V11	6GW8	AF Output
V13	6JH8	Bal. Mod.
V14	12AX7	Trans. AF / Mic Amp

CRYSTALS

Y1501	5500 KHz.	Carrier Osc.
Y1502	5504.6 KHz	Carrier Osc.

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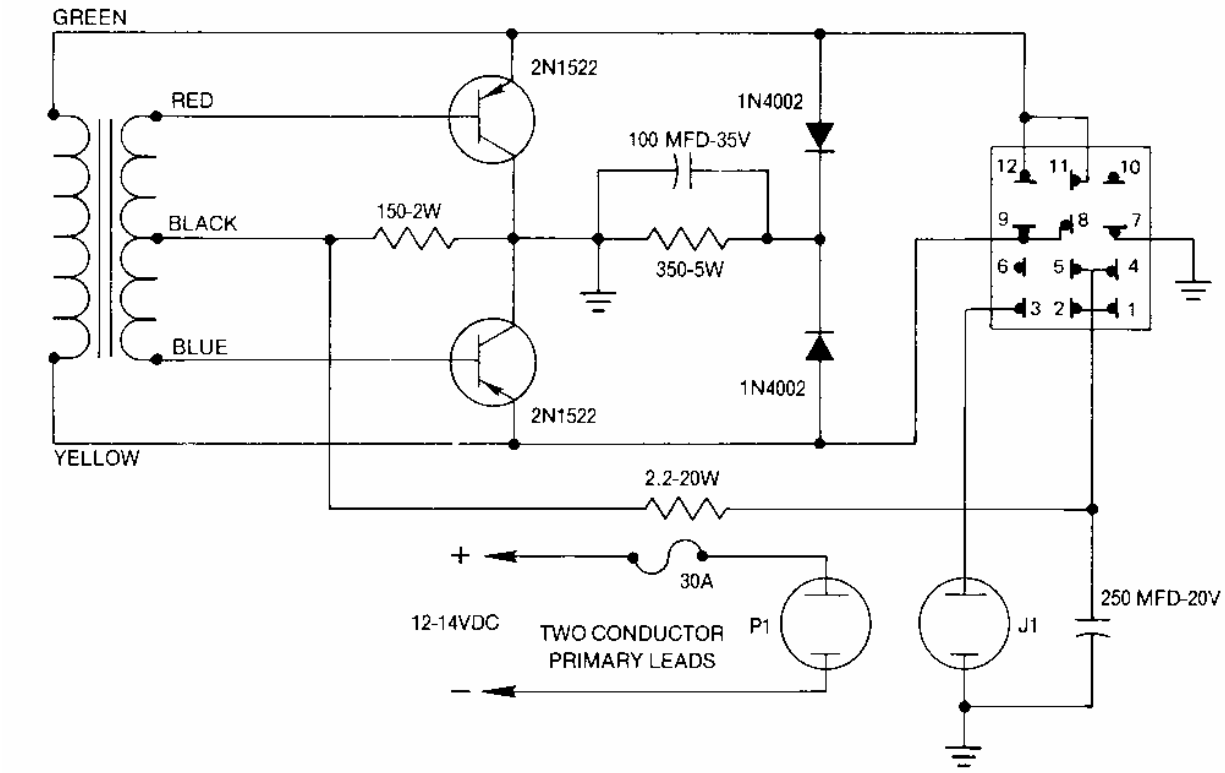

FIGURE 8. SCHEMATIC DIAGRAM, MODEL 14A POWER SUPPLY.

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LIMITED WARRANTY POLICY

SILTRONIX warrants this equipment against defects in material or workmanship, except for tubes and solid-state devices, under normal service for a period of six (6) months from original purchase date. Tubes and solid-state devices are warranted for a period of ninety days (90) days. This warranty is valid only if the enclosed warranty registration card is properly completed and mailed to the factory within ten (10) days of purchase date.

If warranty service is required, do not ship equipment to the factory without prior authorization obtained from the SILTRONIX factory. This warranty is limited to repairing or replacing the defective parts only and is not valid if the equipment has been tampered with, misused or damaged.

Liability for damage during shipment lies with the carrier and not with SILTRONIX. Any claims or adjustments for shipping damages must be filed directly with the carrier.

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